



Babol University of  
Medical Sciences



EUROPEAN  
SOCIETY OF  
CARDIOLOGY

# Tricuspid valve

## ESC/EACTS 2021

By

**DR. Saeed Abrotan**

Fellowship of interventional electrophysiology

Babol university of medical sciences

Cardiology department

# Tricuspid regurgitation

- 0.55% of the general population
- 4% of the patients aged 75 years or more
- Secondary TR is due to pressure and/or volume overload mediated RV dilatation or enlarged right atrium and tricuspid annulus due to chronic AF
- primary TR include infective endocarditis [especially in intravenous (i. v.) drug addicts], rheumatic heart disease, carcinoid syndrome, myxomatous disease, endomyocardial fibrosis, congenital valve dysplasia (e.g. Ebstein's anomaly), thoracic trauma, and iatrogenic valve damage.
- Cardiac implantable electronic device-lead implantation leads to progressive tricuspid regurgitation in 20-30% of the patients

# Evaluation

**Table 9** Echocardiographic criteria for grading severity of tricuspid regurgitation

<b>Qualitative</b>	
Tricuspid valve morphology	Abnormal/flail
Colour flow regurgitant jet	Very large central jet or eccentric wall impinging jet <sup>a</sup>
CW signal of regurgitant jet	Dense/triangular with early peaking
<b>Semiquantitative</b>	
Vena contracta width (mm)	>7 <sup>a,b</sup>
PISA radius (mm)	>9 <sup>c</sup>
Hepatic vein flow <sup>c</sup>	Systolic flow reversal
Tricuspid inflow	E-wave dominant $\geq 1$ m/s <sup>d</sup>
<b>Quantitative</b>	
EROA (mm <sup>2</sup> )	$\geq 40$
Regurgitant volume (mL/beat)	$\geq 45$
Enlargement of cardiac chambers/vessels	RV, RA, inferior vena cava

CW = continuous wave; EROA = effective regurgitant orifice area; PISA = proximal isovelocity surface area; RA = right atrium/right atrial; RV = right ventricle/right ventricular; TR = tricuspid regurgitation.

<sup>a</sup>At a Nyquist limit of 50–60 cm/s.

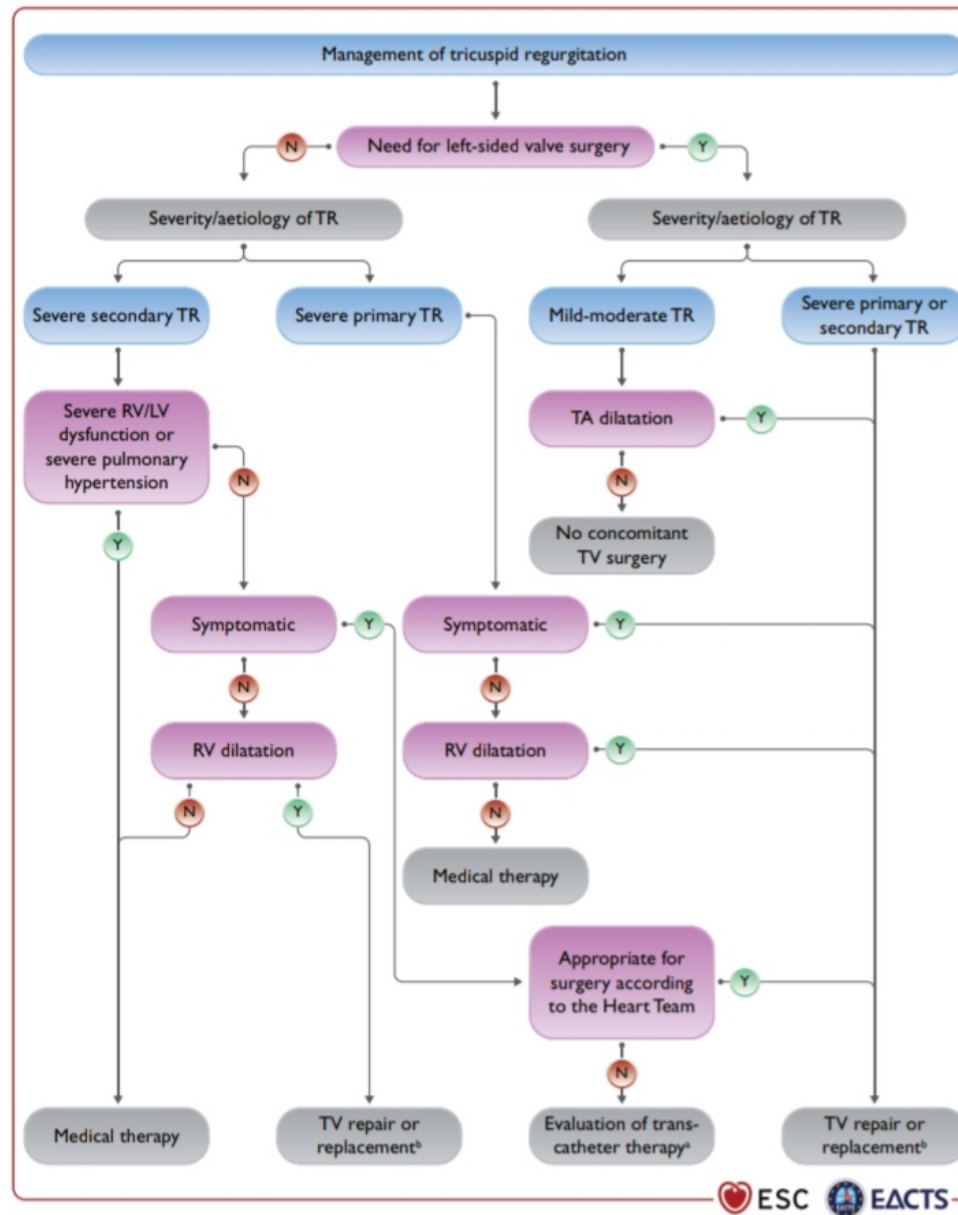
<sup>b</sup>Preferably biplane.

<sup>c</sup>Baseline Nyquist limit shift of 28 cm/s.

<sup>d</sup>In the absence of other causes of elevated RA pressure.

# Indications for intervention

- **Appropriate timing** of intervention is crucial to avoid irreversible RV damage and organ failure with subsequent increased surgical risk
- Severe tricuspid regurgitation is associated with **impaired Survival** and worsening heart failure



**Figure 8** Management of tricuspid regurgitation. LV = left ventricle/left ventricular; RV = right ventricle/right ventricular; TA = tricuspid annulus; TR = tricuspid regurgitation; TV = tricuspid valve. <sup>a</sup>The Heart Team with expertise in the treatment of tricuspid valve disease evaluates anatomical eligibility for transcatheter therapy including jet location, coaptation gap, leaflet tethering, potential interference with pacing lead. <sup>b</sup>Replacement when repair is not feasible.

# Medical therapy

- **Diuretics** are useful in the presence of right heart failure
- the addition of an **aldosterone antagonist** may be considered
- **rhythm control** may help to decrease tricuspid regurgitation(**AF**)
- treatment of **pulmonary hypertension** is indicated in specific cases

# Tricuspid stenosis

- often **combined** with tricuspid regurgitation
- **rheumatic origin** (usually associated with left-sided valve lesions, particularly mitral stenosis)
- **Other causes**: congenital, carcinoid and drug-induced valve diseases, Whipple's disease, endocarditis, and large right atrial tumour.

# Evaluation

- No generally accepted grading of tricuspid stenosis severity exists, but a **mean echocardiographic transvalvular gradient  $>_5$  mmHg** ( at normal heart rate is considered) indicative of **significant tricuspid stenosis**



# Indications for intervention

- tricuspid valve is usually performed concomitantly during procedures for left-sided valve disease
- the choice between **repair and replacement** depends on anatomy and surgical expertise
- **biological prostheses** are usually preferred over mechanical valves, which have a high risk of thrombosis
- **Percutaneous tricuspid balloon valvuloplasty** has been performed in a limited number of cases, either alone or in combination with **PMC**

## Recommendations on indications for intervention in tricuspid valve disease

Recommendations	Class <sup>a</sup>	Level <sup>b</sup>
<b>Recommendations on tricuspid stenosis</b>		
Surgery is recommended in symptomatic patients with severe tricuspid stenosis. <sup>c</sup>	I	C
Surgery is recommended in patients with severe tricuspid stenosis undergoing left-sided valve intervention. <sup>d</sup>	I	C
<b>Recommendations on primary tricuspid regurgitation</b>		
Surgery is recommended in patients with severe primary tricuspid regurgitation undergoing left-sided valve surgery.	I	C
Surgery is recommended in symptomatic patients with isolated severe primary tricuspid regurgitation without severe RV dysfunction.	I	C
Surgery should be considered in patients with moderate primary tricuspid regurgitation undergoing left-sided valve surgery.	IIa	C
Surgery should be considered in asymptomatic or mildly symptomatic patients with isolated severe primary tricuspid regurgitation and RV dilatation who are appropriate for surgery.	IIa	C

### Recommendations on secondary tricuspid regurgitation

Surgery is recommended in patients with severe secondary tricuspid regurgitation undergoing left-sided valve surgery. <sup>423–427</sup>	<b>I</b>	<b>B</b>
Surgery should be considered in patients with mild or moderate secondary tricuspid regurgitation with a dilated annulus ( $\geq 40$ mm or $>21$ mm/m <sup>2</sup> by 2D echocardiography) undergoing left-sided valve surgery. <sup>423,425–427</sup>	<b>IIa</b>	<b>B</b>
Surgery should be considered in patients with severe secondary tricuspid regurgitation (with or without previous left-sided surgery) who are symptomatic or have RV dilatation, in the absence of severe RV or LV dysfunction and severe pulmonary vascular disease/hypertension. <sup>418,433 e</sup>	<b>IIa</b>	<b>B</b>
Transcatheter treatment of symptomatic secondary severe tricuspid regurgitation may be considered in inoperable patients at a Heart Valve Centre with expertise in the treatment of tricuspid valve disease. <sup>f</sup>	<b>IIb</b>	<b>C</b>

2D = two-dimensional; LV = left ventricle/left ventricular; PMC = percutaneous mitral commissurotomy; RV = right ventricle/right ventricular.

<sup>a</sup>Class of recommendation.

<sup>b</sup>Level of evidence.

<sup>c</sup>Percutaneous balloon valvuloplasty can be attempted as a first approach if tricuspid stenosis is isolated.

<sup>d</sup>Percutaneous balloon valvuloplasty can be attempted if PMC can be performed on the mitral valve.

<sup>e</sup>In patients with previous surgery recurrent left-sided valve dysfunction needs to be excluded.

<sup>f</sup>Transcatheter treatment can be performed according to Heart Team at experienced valve centres in anatomically eligible patients in whom improvement of quality of life or survival can be expected.

# Medical therapy

- **Diuretics** are useful in the presence of heart failure symptoms

